

Sorbitol

From Wikipedia, the free encyclopedia

Sorbitol, also known as **glucitol**, is a sugar alcohol that the human body metabolises slowly. It is obtained by reduction of glucose changing the aldehyde group to an additional hydroxyl group.

Contents

- 1 Uses
 - 1.1 Sweetener
 - 1.2 Laxative
 - 1.3 Medicine
 - 1.4 Health care, food, and cosmetics
 - 1.5 Other uses
- 2 Medical importance
- 3 Overdose effects
- 4 Compendial status
- 5 See also
- 6 External links
- 7 Notes & References

Uses

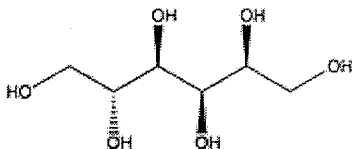
Sweetener

Sorbitol is a sugar substitute often used in diet foods (including diet drinks and ice cream) and sugar-free chewing gum, mints and cough syrups. It may be listed under the inactive ingredients. It also occurs naturally in many stone fruits and berries from trees of the genus *Sorbus*.^[1] Sorbitol is referred to as a nutritive sweetener because it provides dietary energy: 2.6 kilocalories (11 kilojoules) per gram versus the average 4 kilocalories (17 kilojoules) for carbohydrates.

Laxative

Sorbitol can be used as a non-stimulant laxative as either an oral suspension or suppository. It works by drawing water into the large intestine, thereby stimulating bowel movements.^[2] Sorbitol has been determined safe for use by the elderly although it is not recommended without consultation with a clinician.^[3]

Medicine

Sorbitol	
	
IUPAC name	(2S,3R,4R,5R)-Hexane-1,2,3,4,5,6-hexol
Other names	D-glucitol D-Sorbitol
Identifiers	
CAS number	50-70-4
PubChem	82170
MeSH	Sorbitol
SMILES	<div>O[C@H](O)[C@H](O)CO[C@H](O)[C@H](O)CO</div>
Properties	
Molecular formula	C ₆ H ₁₄ O ₆
Molar mass	182.17 g mol ^{−1}
Density	1.489 g/cm ³
Melting point	95 °C
Boiling point	296 °C
<div>✓ (what is this?) (verify)</div> <div>Except where noted otherwise, data are given for materials in their standard state (at 25 °C, 100 kPa)</div>	
Infobox references	

Sorbitol is used in bacterial culture media to distinguish *Escherichia coli* 0154:H7 from most other strains of *E. coli*.

Sorbitol, combined with kayexalate, helps the body rid itself of excess potassium ions in a hyperkalaemic state.^[4] The kayexalate exchanges sodium ions for potassium ions in the bowel, while sorbitol helps to eliminate it.

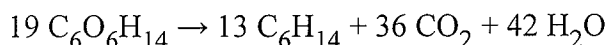
Health care, food, and cosmetics

Sorbitol is often used in modern cosmetics as a humectant and thickener. Sorbitol is often used in mouthwash and toothpaste. Some transparent gels can only be made with sorbitol as it has a refractive index sufficiently high for transparent formulations. Sorbitol is used as a cryoprotectant additive (mixed with sucrose and sodium polyphosphates) in the manufacture of surimi, a highly refined fish paste most commonly produced from Alaska (or walleye) pollock (*Theragra chalcogramma*). It is also used as a humectant in some cigarettes.^[5]

Other uses

A mixture of sorbitol and potassium nitrate has found some success as an amateur solid rocket fuel.^[6]

Sorbitol is identified as a potential key chemical intermediate^[7] from biomass resources. Complete reduction of sorbitol opens the way to alkanes such as hexane which can be used as a biofuel. Sorbitol itself provides much of the hydrogen required for the transformation.



The above chemical reaction is exothermic; 1.5 mole of sorbitol generates approximately 1 mole of hexane. When hydrogen is co-fed, no carbon dioxide is produced.

Medical importance

Even in the absence of dietary sorbitol, cells produce sorbitol naturally. Too much sorbitol production can cause damage.^[8] Diabetic retinopathy and neuropathy may be related to excess sorbitol in the cells of the eyes and nerves. The source of this sorbitol in diabetics is excess glucose, which goes through the sorbitol-aldose reductase pathway.^[9]

In some human enzymes deficiencies such as galactosemia, sorbitol excess arises and can cause damage to the body. In diabetes mellitus, enzyme deficiency in the lens of the eye may cause sorbitol accumulation and cataracts.

Overdose effects

Ingesting large amounts of sorbitol can lead to abdominal pain, gas, and mild to severe diarrhea. Sorbitol ingestion of 20 grams/day as sugar-free gum has led to severe diarrhea leading to unintended weight loss of 24 lbs in a 114 lb woman; another patient required hospitalization after habitually consuming 30 grams/day.^[10] Sorbitol can also aggravate irritable bowel syndrome.^[11]

Compendial status

- Food Chemical Codex ^[12]
- European Pharmacopoeia ^[13] 6.1 ^[14]
- British Pharmacopoeia 2009 ^[15]
- Japanese Pharmacopoeia 15

See also

- Mannitol
- Mouthwash
- Xylitol

External links

- NIH Diabetes dictionary — see entry on sorbitol

Notes & References

- [^] Lehninger *Principles of Biochemistry*, Nelson and Cox, Fourth Edition
- [^] ACS :: Cancer Drug Guide: sorbitol
- [^] Lederle FA: Epidemiology of constipation in elderly patients. Drug utilization and cost-containment strategies. *Drugs and Ageing* 6:465-469, 1995.
- [^] Rugolotto S, Gruber M, Solano PD, Chini L, Gobbo S, Pecori S (April 2007). "Necrotizing enterocolitis in a 850 gram infant receiving sorbitol-free sodium polystyrene sulfonate (Kayexalate): clinical and histopathologic findings". *J Perinatol* **27** (4): 247–9. doi:10.1038/sj.jp.7211677. PMID 17377608.
- [^] Gallaher Group Plc - Ingredients
- [^] Richard Nakka's Experimental Rocketry Web Site
- [^] *Production of Liquid Hydrocarbons from Biomass* Jürgen O. Metzger Angewandte Chemie International Edition Volume 45, Issue 5 , Pages 696 - 698 **2005** link to the publisher
- [^] Sorbitol: a hazard for diabetics? Nutrition Health Review
- [^] Normalizing mitochondrial superoxide production blocks three pathways of hyperglycaemic damage.
- [^] Kathleen Doheny (2008-01-10). "Sweetener Side Effects: Case Histories". WebMD Medical News. <http://www.webmd.com/diet/news/20080110/sweetener-side-effects-case-histories>. Retrieved 2008-01-10.
- [^] Irritable Bowel Syndrome: Causes and Treatment - What can aggravate my symptoms?
- [^] The United States Pharmacopeial Convention. "Revisions to FCC, First Supplement". <http://www.usp.org/fcc/FCC61SBallotResultsWebPostingReport04.html>. Retrieved 6 July 2009.
- [^] Sigma Aldrich. "D-Sorbitol". <http://www.sigmaaldrich.com/catalog/ProductDetail.do?lang=en&N4=97336>. Retrieved 6 July 2009.
- [^] European Pharmacopoeia. "Index, Ph Eur". https://www.edqm.eu/store/images/majbdd/200709201618250.6_1%20IndexE.pdf. Retrieved 6 July 2009.
- [^] British Pharmacopoeia (2009). "Index, BP 2009". http://www.pharmacopoeia.co.uk/pdf/2009_index.pdf. Retrieved 6 July 2009.

Retrieved from "<http://en.wikipedia.org/wiki/Sorbitol>"

Categories: Osmotic diuretics | Sugar alcohols | Sweeteners | Excipients

- This page was last modified on 25 September 2009 at 14:20.
- Text is available under the Creative Commons Attribution-ShareAlike License; additional terms may apply. See Terms of Use for details.

Wikipedia® is a registered trademark of the Wikimedia Foundation, Inc., a non-profit

organization.